**COLLEGE OF ENGINEERING AND ARCHITECTURE COMPUTER ENGINEERING DEPARTMENT**

## ACADEMIC YEAR: 2021-22
## SPRING SEMESTER
## COURSE: DATA STRUCTURES CIS 202

**FINAL PROJECT** JAVA COLLECTIONS FRAMEWORK

| Question Number | Student Grade | Max Grade | CLO |
|---|---|---|---|
| **Q1** | | **5** | **3.1** |
| **Q2** | | **5** | **4.1** |
| **Presentation** | | **5** | |
| **Total** | | **15** | |

According to [1], the Java platform includes a *collections framework*. A *collection* is an object that represents a group of objects (such as the classic Vector class). A collections framework is a unified architecture for representing and manipulating collections, enabling collections to be manipulated independently of implementation details. The primary advantages of a collections framework are that it:

- **Reduces programming effort** by providing data structures and algorithms so you don't have to write them yourself.
- **Increases performance** by providing high-performance implementations of data structures and algorithms. Because the various implementations of each interface are interchangeable, programs can be tuned by switching implementations.
- **Provides interoperability between unrelated APIs** by establishing a common language to pass collections back and forth.
- **Reduces the effort required to learn APIs** by requiring you to learn multiple ad hoc collection APIs.
- **Reduces the effort required to design and implement APIs** by not requiring you to produce ad hoc collections APIs.
- **Fosters software reuse** by providing a standard interface for collections and algorithms with which to manipulate them

Figure 1 shows the different components in the collection framework.

**Q1. Work in a group to solve this assignment. (each group 2-3students)**

**Q2. Your submission should cover the following.**

1. Prepare a report about the Java collection framework.
2. Study in more depth the **TreeSet, LinkedList,** and **PriorityQueue** classes.
    a. Report on their usage and advantages.
    b. Compare between them.
    c. Develop an example in java to demonstrate the use of these classes.
3. Your report should consist of the following:
    a. A title page (faculty, department, project name, team members, date)
    b. A table of content with page numbers
    c. An introduction summarizes what you have presented in the report.
    d. Divide your report into a set of main section and subsections. Number the main section as (1. Main section), and the subsections (1.1 subsections)
    e. The font type is times
    f. The font size (16 for main sections, 14 sub sections, and 12 for body text)
    g. Use appropriate references for every single source you use. Moreover, list all of them in a reference section.
4. **Submit the word file and a PDF file** for your report.
5. Prepare a presentation on PowerPoint, **submit the presentation**. There will be a schedule to present your work in the class.
6. **Submit the .Java** files for your example(s)

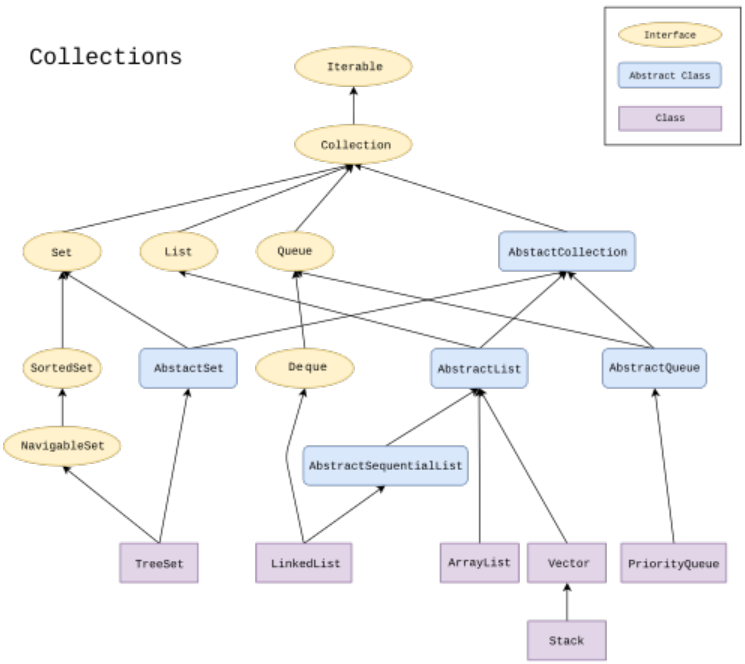

Figure 1. Collection framework architecture [2].

## References

[1] Oracle, https://docs.oracle.com/javase/8/docs/technotes/guides/collections/overview.html, Last accessed November 2021.

[2] Wikipedia, https://en.wikipedia.org/wiki/Java_collections_framework, Last accessed, Nov, 2021.